

Remarks/Arguments

Claims 1 and 2 are pending in the present application. Claims 1 and 2 stand rejected. In the present Amendment, the specification and claims 1 and 2 have been amended. New claims 3-20 have been added. It is respectfully submitted that no new matter has been introduced into the present application by any of the amendments or by the addition of the new claims. Reconsideration of the present application is respectfully requested in view of the following remarks.

The objection to claims 1 and 2 due to the use of the abbreviations HP3 and HP4+ is respectfully traversed. The meaning of these terms is clear from the specification of the present patent application, as shown by the Examiner's understanding of the meaning of these terms (see page 5, lines 2-6, and page 6, lines 10-14, of the Office Action). However, to expedite the prosecution of the present application, these terms have been replaced in claims 1 and 2. It is respectfully submitted that the meaning of these terms is clear and that the text used in claims 1 and 2 to replace these terms has the same meaning and scope as the terms themselves. In this regard, it is respectfully submitted that the terms "quat-" and "tetra-" both have the same meaning (i.e., both representing the number "4").

With respect to the objections to the specification, it is respectfully submitted that these objections have been rendered moot by the amendments to the specification. In addition, it is respectfully submitted that it is abundantly clear from the disclosure contained in the specification that in the maltitol solution of claim 1, which contained 62 to 68% by weight solids, the remainder of the solution would be the solvent (i.e., water). Thus, a person of skill in the art would understand from the specification that, for example, the maltitol solution described at page 11, lines 9-10, which has 62 to 68% solids content, would also have a water content of 32 to 38% by weight. However, in order to expedite the prosecution of the present application, applicants have inserted the text of claims 1 and 2 (as originally filed) into the specification of the present patent application.

The rejection of claims 1 and 2 under 35 U.S.C. 112, second paragraph, as being indefinite is respectfully traversed for the reasons set forth below.

With respect to the Examiner's comments concerning the use of the terms "HP 3

compounds” and “HP4+ compounds”, it is respectfully submitted that the meanings of these terms are clear from the disclosure contained in the specification. However, in order to expedite the prosecution of the present patent application, claims 1 and 2 have been amended as discussed above.

With respect to the Examiner’s comments concerning claim 2 and the lack of identification of the solvent, it is respectfully submitted that this rejection has been rendered moot by the amendments to claim 2.

With respect to the Examiner’s comments concerning claim 2 and the “ion exchange” step, it is respectfully submitted that this rejection has been rendered moot by the amendments to claim 2.

The Examiner’s rejection of claim 2 due to the use of the term “hydrogenation catalyst” is respectfully traversed. It is respectfully submitted that a person of skill in this art knows what a “hydrogenation catalyst” is and knows what hydrogenation catalysts would be suitable in the process claimed in claim 2. Applicants provided an example of such a hydrogenation catalyst in the specification. There is no reason why the claims must be limited to the use of the specific hydrogenation catalyst that is exemplified in the specification.

The rejection of claim 1 under 35 U.S.C. 103(a) as being unpatentable over Lynch (US 4,471,001) is respectfully traversed for the reasons set forth below.

The Lynch reference teaches maltitol syrups that are used to form clear, stable and edible gels. The Lynch reference teaches that the maltitol syrups can contain sorbitol, maltitol, higher saccharides and reducing sugars. Broad ranges are disclosed for each of these components of the maltitol syrups. Further, the Lynch reference teaches that the total dissolved solids content of the syrups can be from 60 to 85% by weight, when calculated on a wet basis. The broad solids content disclosure of the Lynch reference is not connected to any particular formulation of the syrup. However, the Lynch reference clearly teaches away from maltitol syrups that contain less than 75% by weight solids content. This teaching is contained at column 3, lines 40 to 47, wherein, in Demonstration I, Lynch tested maltitol syrups with solids contents of 71%, 72%, 75% and 80% by weight and determined that the syrups with less than 75% by weight solids

supported mold growth, whereas the 75% and 80% by weight solids syrups did not. This is why Lynch repeatedly teaches that the solids content of the maltitol syrups should preferably be 75% or greater (see column 1, lines 47-51; column 2, lines 67-68; and the only three formulations that were actually made and characterized in the Lynch reference – the Preparation II syrup that is used in the production of Preparation III with 77.5% solids, Preparation III with 79% total solids and Preparation IV with 75% solids). Accordingly, one of ordinary skill in the art would understand from the teachings of the Lynch reference that the maltitol syrups described therein should not have solids contents that are less than 75% by weight.

In addition, although the Lynch reference discloses broad ranges for each of the components of the maltitol syrups, including a range for maltitol that is from 25-94% by weight on a dry basis, there are only three maltitol syrups that appear to have been actually made and characterized in the Lynch reference. Those three syrups are the Preparation II syrup that is described in the production of Preparation III, Preparation III itself and Preparation IV of the Lynch reference. The syrups described in the paragraphs entitled Preparation I and Preparation II, have compositions that are given in broad ranges for each ingredient, which cannot be considered to be a specific disclosure of a particular syrup composition. The syrups described in the paragraphs entitled Preparation I and Preparation II were either not made or were not actually characterized, so that their compositions were just estimated. With respect to the three maltitol syrups that Lynch describes in detail, the specific Preparation II syrup that was used to produce Preparation III is the only one of the three maltitol syrups that has a high maltitol content (over 85% by weight on a solids basis). This Preparation II is said to contain 94% by weight maltitol, 5% sorbitol and 2.6% higher saccharides. However, a person of skill in this art would immediately recognize that this composition is impossible because the cumulative percentages of the components exceeds 100% (e.g., the cumulative percentages equal 101.6%). If the percentages of each component is reduced proportionally so that the total will equal 100%, then the composition would actually have been 92.5% maltitol, 4.9% sorbitol and 2.6% higher saccharides. However, this composition could not have been used to produce Preparation III in the manner described in the paragraph describing the production of Preparation III (i.e., a 50/50 blend of a material from Preparation I containing 19.8% water with a material from Preparation II containing 22.5% water and the composition shown above), because a simple mass balance on each ingredient shows that if the composition of the Preparation II material was 92.5% maltitol,

4.9% sorbitol and 2.6% higher saccharides and the water content was 22.5%, then the composition of the material from Preparation I (having 19.8% water) would be 44.1% maltitol, 9.98% sorbitol, 39.2% higher saccharides and 0.0823% reducing sugars. This composition would not even fall within the broad ranges described for Preparation I because it is deficient in both sorbitol and higher saccharides. Since the amount of reducing sugars is within the range described for Preparation I and there is no reducing sugar content in the Preparation II used to make Preparation III, we can assume that the reducing sugar content is correct. Using that as a starting point and assuming that the amount of sorbitol and higher saccharides are at least the minimum amounts specified for Preparation I (i.e., 11% sorbitol and 41% higher saccharides), we can calculate that the amount of maltitol that was actually in the Preparation II that was used to make Preparation III was 47.9%, which is close to the maximum amount (i.e., 49%) of maltitol that is permitted in Preparation I. This means that if the composition of Preparation III is accurate, the amount of maltitol that was in the Preparation II used to make Preparation III was 88.5% by weight (dry basis). Accordingly, it is respectfully submitted that a person of skill in this art, upon reading the disclosure in the Lynch patent contained at column 3, lines 15 to 23 (the Preparation III paragraph), would immediately understand that the composition described as Preparation II was in error and that the amount of maltitol was, at a maximum, 92.5% by weight. It is also respectfully submitted that, upon realizing that this error had been made by Lynch, the artisan would have set out to determine the actual amount of maltitol in the Preparation II and would have determined, through simple mass balances, that the actual amount was, at a maximum, 88.5% by weight (solids basis).

Since the Preparation II that was used to make Preparation III is the only specific teaching of a formulation in the Lynch reference that contained a high amount of maltitol and this teaching is clearly flawed in that the composition provided is obviously incorrect on its face, it is respectfully submitted that the only relevant teaching in Lynch is of a maltitol syrup that has 92.5% by weight (dry basis) maltitol (at a maximum and the actual teaching is less than that, probably about 88.5% by weight maltitol). The amounts of sorbitol and higher saccharides in that maltitol syrup would obviously be more than what is specifically disclosed in Lynch to make up for the lower amount of maltitol. In any event, it is respectfully submitted that the only example of a 94% by weight maltitol syrup that was disclosed in Lynch is clearly in error and this brings into question the 94% by weight maltitol upper limit that Lynch discloses for the

range of maltitol in the formulation. It is clear that Lynch was relying on the 94% maltitol example to support the upper limit of the range for maltitol. Since the amount of maltitol in that formulation was, at best 92.5%, and more likely 88.5%, by weight maltitol, it is respectfully submitted that the disclosure of Lynch is not enabling for maltitol syrups that contain 94% by weight maltitol. An artisan of ordinary skill in this art would not have an expectation of success of producing a maltitol syrup having a maltitol content of 94% by weight (solids basis) after reviewing the teachings of the Lynch patent.

In view of the above discussion, it is respectfully submitted that the Lynch patent does not and cannot support a prima facie case of obviousness with respect to the maltitol solutions of the present claims. Specifically, the Lynch patent teaches away from maltitol syrups that contain less than 75% by weight solids and, when the entire teachings of the Lynch patent are taken into consideration (including the errors discussed above), the Lynch patent cannot be said to provide an enabling teaching or an expectation of success for producing maltitol syrups that contain more than 88.5 to 92.5% by weight maltitol (dry solids basis).

It is respectfully submitted that the Examiner's reasoning for why one of ordinary skill in this art would be motivated to modify the teachings of the Lynch reference in order to obtain the maltitol solution of the present claims is incorrect and actually supports the non-obviousness of the present claims. Specifically, the Examiner acknowledged in the last paragraph of page 5 of the Office Action that the motivation for modifying Lynch is found in the Lynch reference in the teachings concerning the "proliferation of airborne microorganisms such as mold when the total solids content is about 75% by weight and preferably about 80%". However, this teaching would motivate an artisan of ordinary skill to keep the solids content high, above 75%, and teaches away from dropping the solids content below 75% (because the syrups are then susceptible to mold growth). Thus, the teachings of the Lynch reference would not motivate a person of ordinary skill in this art to modify the maltitol syrups of Lynch so that the solids content is less than 75% by weight.

In addition, the Lynch reference contains no teaching whatsoever of a maltitol syrup having a maltitol content above 94% by weight (solids basis). As applicants have discussed in detail above, the true teachings of the Lynch reference do not even support or enable a maltitol

syrup that has 94% by weight (solids basis) maltitol. Instead, due to clear errors made in the Lynch reference, the maximum amount of maltitol in the maltitol syrups of the Lynch reference is really 88.5 to 92.5% by weight (solids basis). In any event, the Lynch reference cannot be said to disclose or suggest maltitol syrups that contain more than 94% by weight maltitol (solids basis). For this reason, claims 3-17 are clearly novel and non-obvious over the Lynch reference.

With respect to the limits for the ranges of maltitol recited in claims 3-17, it is respectfully submitted that all of the recited ranges are within the broad range recited in claim 1 and disclosed in the specification at page 5, line 7. Each of the end points for each recited range can be found in the specification (e.g., see Batch F for 94.2% maltitol and Batch G for 95.9% maltitol; Table 1 on page 15). Similarly, all of the recited ranges for the other components are also within the broad ranges recited in the specification and each endpoint is also specifically disclosed in the specification.

The rejection of claim 2 under 35 U.S.C. 103(a) as being unpatentable over Lynch (US 4,471,001) in view of Darsow (US 5,641,872) is respectfully traversed for the reasons set forth below.

As the Examiner has acknowledged, the Lynch reference does not teach a process for making maltitol syrups wherein the hydrogenation step employs a reaction promoter comprising magnesium powder. To overcome this deficiency in the teachings of the Lynch reference, the Examiner has cited the Darsow reference, which allegedly shows the use of non-catalytic pyrophoric metal powders such as aluminum, manganese or titanium in combination with a hydrogenation nickel catalyst to produce epimer free maltitol. From this teaching, the Examiner stated that “one skilled in this art would be motivated to substitute the aluminum powder (pyrophoric metal powder) of said prior art with the non-catalytic pyrophoric metal powder of magnesium because the use of magnesium may also be helpful in the higher hydrogenation activity due to its reducing properties which renders the instantly claimed use of pyrophoric magnesium powder obvious.”

It is respectfully submitted that the Examiner’s reasoning for why the use of magnesium powder would be obvious in view of the Darsow reference is both incorrect and clearly based on a hindsight analysis. The Darsow reference does not contain any of the teachings that the

Examiner relies on in the obviousness rejection. For example, the Darsow reference does not teach that magnesium is an acceptable metal for addition to the hydrogenation reaction. It also does not teach that magnesium has reducing properties or that magnesium is pyrophoric. In fact, the present application does not disclose or claim that the magnesium powder is pyrophoric. Accordingly, the Examiner's comments concerning the "instantly claimed use of pyrophoric magnesium powder" is not understood. Magnesium is not pyrophoric unless it is very pure and has a very high surface area (such as extremely fine powder). The present application does not teach that the magnesium powder is pyrophoric.

It is respectfully submitted that the only teaching contained in the Darsow reference concerning magnesium is a general teaching that one of the major deficiencies of the prior art hydrogenation processes was that they used alkaline earth metals (presumably to adjust the pH of the hydrogenation solution) and those metals then had to be laboriously removed from the end product (see column 3, lines 17-22). Thus, since magnesium is an alkaline earth metal, and the Darsow reference teaches that the use of alkaline earth metals was a problem with the prior art, the Darsow reference teaches away from the use of magnesium.

Still further, the Examiner has apparently overlooked the fact that the entire focus of the Darsow reference is that the specific process described therein, which uses a special catalyst which is shaped and has a specific composition, reduces the expense of the catalyst and permits the hydrogenation reaction to be run at a much lower temperature (i.e., from 40 to 80 °C) (see column 3, lines 50-65, and column 4, lines 7-11). Darsow stresses the use of the lower temperature during hydrogenation and teaches that the use of higher temperatures (above 80 °C) is disadvantageous and problematic (see paragraph bridging columns 5 and 6). Thus, it is incontrovertible that Darsow teaches away from using the elevated hydrogenation temperatures that are used in the Lynch reference and claimed in the present application.

Finally, since neither Lynch or Darsow contains any specific teaching concerning the use of a magnesium powder promoter in the hydrogenation process, it is respectfully submitted that the Examiner is using the teachings of the present application to support the obviousness rejection, which is a classic example of the improper use of hindsight to reconstruct the claimed invention. The cited prior art provides absolutely no specific teachings at all concerning

magnesium, and the only general teaching is that the use of alkaline earth metals is to be avoided. Thus, without using the teachings of the present application, a person of ordinary skill in this art would not even consider the use of magnesium powder in the hydrogenation process.


In view of all of the above, it is respectfully submitted that the rejection of claim 2 under 35 U.S.C. 103 (a) is improper and should be withdrawn.

It is respectfully submitted that all of the present claims are in allowable condition. Accordingly, issuance of a Notice of Allowability for claims 1-20 of the present application is respectfully requested.

Should the Examiner have any questions concerning this paper, the Examiner is invited to telephone applicant's undersigned representative.

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Respectfully submitted,

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